FORTIS
STRONG MOTION ACCELEROMETER

Designed to be 'best in class', our most versatile accelerometer yet.

KEY FEATURES
> Slimline design
> Switchable gain
> Easy, rapid deployment
> Also available with waterproof, stainless steel casing for posthole deployment

APPLICATIONS
> Earthquake early warning systems
> Structural health monitoring
> Shake intensity research
Fortis

The Güralp Fortis is a strong motion analogue accelerometer with an innovative, slim-line design for fast installation in any environment.

FORTIS AT ACTUAL SIZE
(125 MM DIAMETER)

THE FORTIS IS ALSO AVAILABLE IN A STAINLESS STEEL CASING SUITABLE FOR POSTHOLE DEPLOYMENT*

*GAIN IS CONTROLLABLE REMOTELY VIA THE GÜRALP MINIMUS DIGITISER
Our state-of-the-art gain switch allows the instrument to perform optimally in a wide range of earthquake shaking scenarios providing versatility for all earthquake early warning and structural health monitoring applications.

The Güralp Fortis is a very low-noise, force-feedback accelerometer with a large dynamic range, suitable for seismology, hazard mitigation and civil engineering applications.

The Fortis has one output which can be set at a wide range of gain options, providing flexibility for all strong motion monitoring applications.

The system has both a flat response to ground acceleration from DC to 100 Hz and a stable phase response within the passband.

The hard anodised aluminium casing protects the instrument from water, allowing it to be deployed in a range of environments.

**Posthole Deployment**

For subterranean deployments, the Fortis instrument incorporates the Fortis sensor housed in a stainless steel enclosure with a 100 bar / 10 MPa waterproof connector and an optional lifting bail.

**Require a digital accelerometer?**

The Fortimus digital accelerometer is integrated with the feature-rich Minimus digitiser in one compact unit. Simple to use and quick to install, the Fortimus offers advanced data recording and communications features plus an ultra-low-latency mode for earthquake early warning. Find out more here: [www.guralp.com/products/surface#fortimus](http://www.guralp.com/products/surface#fortimus)

### Applications

- Earthquake Early Warning systems
- Structural Health Monitoring (e.g. dams, industry, buildings)
- Surface and vault installation
- Posthole deployment
- Networked Arrays

### Key features

- Very low-noise components for high precision and enhanced dynamic range
- Fixing bolt allows rapid installation for structural health monitoring
- Slimline shape
- Switchable gain from 0.5 to 4.0 g controllable manually on the sensor or remotely using the Güralp Minimus digitiser
- Simple installation with a single M8 fixing bolt; robust and waterproof
- The sensor doesn’t require levelling to operate, however a physical bubble level is provided for instances where a level installation is desired
- Isolated power supply for 10 - 36 V operation
- Acceleration offsets adjustable for <1 mV precision

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![Sensor self-noise](image-url)
### Fortis

#### SPECIFICATIONS

**SYSTEM**
- Configuration / Topology: Triaxial orthogonal

**PERFORMANCE**
- **Acceleration output band**: DC – 100 Hz standard
- **Gain switch options**: ±4 g, ±2 g, ±1 g or ±0.5 g
- **Sensitivity**: 2.5 V/g, 5 V/g, 10 V/g, 20 V/g
- **Peak / Full scale output**:
  - Differential: ±20 V (40 V peak-to-peak)
  - Single-ended (e.g. mass positions): ±10 V (20 V peak-to-peak)
- **Clip level**: 4.2 g
- **Sensor Dynamic Range**: > 160 dB
- **Self-noise below NHNM**: > 0.06 Hz (< 17 seconds)
- **Self-noise below ALNM**: 0.8 to 45 Hz
- **Cross axis rejection**: 0.001 g/g
- **Linearity**: 0.1% full scale
- **Lowest spurious resonance**: > 450 Hz
- **Offset zeroing**: Automatic on start up and on user command
- **Calibration controls**: Independent signal & enable lines exposed on sensor connector

**POWER**
- **Power voltage range**: 10–36V DC*
- **Power consumption (at 12 V DC)**: 1.5 W standard

*Power voltage for operation of this unit only. Connection to additional instrumentation or use of longer cables may result in a higher input voltage requirement

**ENVIROMENTAL**
- **Operating temperature**: -20 to +70 °C

**PHYSICAL**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Standard Fortis:</th>
<th>Posthole Fortis:</th>
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</thead>
<tbody>
<tr>
<td><strong>Diameter</strong></td>
<td>125 mm</td>
<td>125 mm</td>
</tr>
<tr>
<td><strong>Height with feet and ports</strong></td>
<td>99 mm</td>
<td>78 mm</td>
</tr>
<tr>
<td><strong>Height (sensor only)</strong></td>
<td>66 mm</td>
<td></td>
</tr>
<tr>
<td><strong>Enclosure/Materials</strong></td>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>1.1 kg</td>
<td></td>
</tr>
<tr>
<td><strong>Communication / Connector</strong></td>
<td>Military specification connector</td>
<td>100 bar / 10 MPa waterproof connector (height 32 mm)</td>
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<tr>
<td><strong>Optional fixing</strong></td>
<td>M8×75 fixing bolt</td>
<td>Optional lifting bail assembly</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>0 - 100%</td>
<td>259 mm</td>
</tr>
<tr>
<td><strong>Environmental protection</strong></td>
<td>IP68 - protection against effects of prolonged immersion at 3 m depth for 72 hours</td>
<td>IP68 - protection against effects of permanent immersion under pressure to 350 m depth</td>
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Güralp Systems Limited  
Midas House  
Calleva Park  
Aldermaston  
Reading  
RG7 8EA  
United Kingdom  

T +44 118 981 9056  
F +44 118 981 9943  
E sales@guralp.com  

www.guralp.com

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